Environmental Technology Verification (ETV) Coatings and Coating Equipment Program (CCEP)

Technology Provider Guidance Document

Draft

July 7, 1998

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EXECUTIVE SUMMARY

In January of 1997, a cooperative agreement was executed between the Environmental Protection Agency (EPA) and Concurrent Technologies Corporation (*CTC*) to establish and operate the Environmental Technology Verification (ETV) Coatings and Coating Equipment Program (CCEP). This document details program background, information required for participation, verification procedures, and operating policies of the ETV CCEP verification process.

The ETV CCEP is a key component of the EPA's ETV Program. This program was designed to implement President Clinton's *Bridge to a Sustainable Future*, a strategy to advance innovative environmental technologies. The intent of the program is to verify the performance of new, commercial-ready environmental technologies and transfer this information to important customer groups such as coatings users and coatings applicators, especially small- to medium-sized businesses, state permitting agencies, and engineering consulting organizations.

The ETV CCEP will provide unbiased, third party verification data for new surface coatings and application equipment which claim to produce lower volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions when used. The verification will be accomplished by evaluating innovative coatings and/or technologies using standardized protocols, industry support and guidance via a stakeholders group, and broad acceptance of results. The program objective is to focus on identifying and verifying those technologies that are ready for the market and essential to serve industry needs.

The material contained in this document is designed to provide the reader with a comprehensive understanding of the procedures, protocols, and policies under which the ETV CCEP will operate. This document is a supplement to the Request for Technologies (RFT). The RFT identifies the particular focus area, product requirements, scope of testing, and schedule for the focus area. The five sections of this booklet can be summarized as follows: Section 1 provides an overview of *CTC* and the ETV CCEP, including a brief step-by-step discussion of the entire process; Section 2 lists the information required to participate in the verification process; Section 3 describes the verification process in more detail, including a list of representative verification criteria that may be used when verifying a particular product or technology; Section 4 discusses some of the basic operating policies of the program; and Section 5 is a list of terms and definitions used throughout the verification process.

1.0 PROGRAM OVERVIEW

The Environmental Technology Verification (ETV) Coatings and Coating Equipment Program (CCEP) is part of the new EPA initiative, the ETV Program. The ETV CCEP is a collaborative effort between the EPA and *CTC* in conjunction with the National Defense Center for Environmental Excellence (NDCEE) in Johnstown, PA. The NDCEE is operated by *CTC,* and the existing equipment and facilities supporting the NDCEE will be available to support ETV CCEP activities. Initially, the program will focus on organic finishing coatings and application technologies.

1.1 Background - The Need for Verification of Surface Coating Technologies

Many manufacturers of new coatings and coating equipment claim to market products that significantly reduce volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions. Most of these claims are not verified by an unbiased, third party. These technologies are being developed and marketed without standard evaluation protocols. Potential customers may have quality, compatibility, and cost questions about the new product or technology that are not answered by manufacturers' data. Verification of performance characteristics is needed to ensure that products are better from an environmental perspective at equivalent or enhanced performance and competitive cost. The establishment of the ETV CCEP will assist coating and coating equipment developers in gaining customer confidence by generating performance data about their products and technologies as an unbiased, third-party testing facility.

Small businesses collectively represent a large percentage of industrial operations, yet individually, face significant barriers to technology implementation such as limited resources, lack of internal expertise, and limited scope (technology evaluation is not a company focus). The ETV CCEP will make verification testing more readily accessible to small- and medium-sized businesses and their technical assistance providers, and it will diffuse the results to these groups. The ETV CCEP will verify a wide range of coatings and coating equipment technologies and will plan and conduct performance benchmark evaluations for each technology. These evaluations will assist in product acceptance and approval by regulatory agencies as well as the private sector businesses that will install and use the technologies.

A technology stakeholders group has been established to assist the ETV CCEP in achieving its goal. The purpose of the group is to:

- Lend its expertise in determining and prioritizing technology focus areas for testing
- Review the technologies responding to ETV CCEP requests
- Assist with the development of the test protocols for verification testing
- Assist with technical outreach

The group will meet regularly to discuss ETV CCEP activities.

1.2 *CTC* Background and Capabilities

The ETV CCEP is operated and managed by *CTC*, which operates the NDCEE program. *CTC* is an independent, non-profit organization headquartered in Johnstown, PA. *CTC* is committed to assisting industry and government in achieving world-class competitiveness. Through a unique concurrent engineering framework, *CTC* provides comprehensive solutions that improve our clients' product quality, productivity, and cost effectiveness. The professional staff of *CTC* has the requisite experience, knowledge, and resources to rapidly and effectively meet the diverse needs of our clients by transitioning appropriate science, technology, and management applications.

Over the last decade, the Department of Defense (DOD) has come to recognize its responsibility to reduce toxic waste discharges and employ environmentally acceptable manufacturing technologies whenever technically and economically feasible. To this end, the DOD established the NDCEE in 1990 to "serve as a national leadership organization to address high priority environmental problems for DOD, other government organizations, and the industrial community." The NDCEE's initial mission is to:

- Transition environmentally acceptable materials and processes to defense industrial activities and private industry
- Provide training that supports the use of new environmentally acceptable solutions
- Perform applied research and development, where appropriate, to accelerate the adoption of new technologies

In support of this mission, the NDCEE has established a demonstration factory and is tasked to provide solutions for specific problems using commercial or near-commercial technologies.

Since the establishment of the NDCEE, *CTC* has demonstrated expertise in surface coating technologies through various projects and other related experiences. These technologies are found in the demonstration factory at the Environmental Technology Facility (ETF) at *CTC*. The facility has 428,000 ft^2 of existing manufacturing floor space. The DOD, industry, and non-DOD Federal Agencies have planned research, demonstration, and evaluations at *CTC* that can be leveraged by the ETV CCEP through synergistic use of resources. The organic finishing line, located in the ETF, is used to apply organic coatings to various substrates. The system is capable of processing parts 4'x 4'x 3' in size and weighing up to 250 pounds. The equipment currently available on the finishing line includes the following:

Washer/Pretreatment Line
A seven stage pretreatment process designed to clean and pretreat parts prior to painting operations. The system has the flexibility to vary process parameters and solution chemistries.

Dry-Off Oven
Direct gas-fired oven used to dry and/or preheat parts prior to painting.

Automatic/Manual Nordson Powder Coat System Model Excel 2002 and Batch Powder Booth
Powder coating application booths capable of demonstrating powder coating on a large production-scale or batch basis.

Cathodic E-Coat Line
Application of cathodic electrocoat epoxy primer.

Spray Booths
Two steel spray booths equipped with rear exhaust units and dry filters.

Liquid Application Equipment
Several liquid spray guns, including: a Can Am HVLP Turbine system; a Graco Model 235-463 airless spray gun; a Sharpe Model 775 conventional air spray (CAS) gun; a DeVilbiss Model JGA 502 CAS gun, a DeVilbiss Model OMX 502 HVLP pressure feed gun, and an OMX 611 HVLP suction feed gun; and a Binks Model 2001 CAS gun.

Infrared (IR) Cure Oven
Infrared cure of coatings.

Convection Cure Oven
Standard direct gas-fired cure oven.

It may be necessary to test a particular technology (e.g. ultraviolet (UV)-curable systems) at a site other than *CTC*. If such is the case, the testing will be done under the control and close observation of ETV CCEP personnel, and always in compliance with the verification protocol. This includes any and all quality assurance and appropriate laboratory analyses.

In addition to the process equipment listed above, *CTC's* laboratory is well equipped for analytical chemistry and product quality testing. The laboratory follows published methodologies, such as federal specifications, military specifications, ASTMs, and supplier instructions, wherever possible for testing protocols. Table 1 displays representative laboratory testing capabilities for surface coatings.

Table 1. Representative Laboratory Testing Capabilities

Destructive and Non-Destructive Product and Materials Testing	Process Chemical Control and Environmental Analysis
• Corrosion Resistance • Weather Resistance • Humidity Resistance • Failure and Fracture Analysis • Scanning Electron and Light Optical Microscopy • Metallography • Coating Thickness • Glow Discharge • Hardness and Micro-hardness • Chemical Agent Resistance • Temperature Resistance • Adhesion • Surface Cleanliness (particle counting, gravimetric, optical stimulated electron emission) • Gloss • Impact and Abrasion Resistance • Color • Profile	• Wet and General Chemistry (pH, conductivity, solids, temperature, acidity, alkalinity, etc.) • Titrimetry • Chromatography (ion, gas, and high pressure liquid) • Mass Spectrometry (volatiles and semi-volatiles) • Atomic Absorption Spectroscopy • Atomic Emission Spectroscopy • Flow Injection Analysis • TCLP (organics, inorganics) • Flashpoint, Reactivity, Ignitability • Total Organic Carbon • Air Sampling and Monitoring (acid gases, halogen, metals, nitrogen oxides, particulates, sulfur oxides, VOCs)

Finally, *CTC* has a substantial amount of project experience with equipment and coatings testing. Projects in the past have tested paint additives and their effect on transfer efficiency (TE); powder coating performance and applications; and liquid spray painting equipment performance, to name a few.

1.3 ETV CCEP Purpose

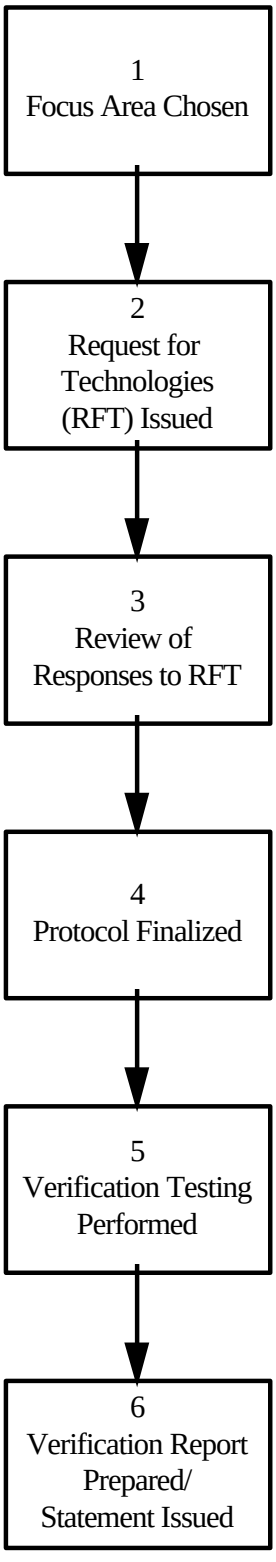
The ETV CCEP is structured to evaluate a wide range of environmental organic surface coating products. The term "product" includes both coatings and application equipment. These products need not be "high tech" in nature as many of the products which would benefit from the services of the ETV CCEP may be considered simple technologies. The most important attribute of a technology is that it meets real world needs. Therefore, the terms "new or innovative technology" can cover a broad spectrum of products.

Removing the barriers that prevent the effective introduction of innovative technology into the market place will benefit the present system by:

- Advancing the acceptance and use of innovative technologies in the manufacturing engineering marketplace
- Expanding the opportunities for bringing new technologies into the marketplace
- Reducing the time and expense for market introduction
- Enhancing private industry incentives to invest in manufacturing technology research and development
- Providing a value-added service to the manufacturing and surface coatings community

1.4 The ETV CCEP Verification Process

This section provides a description of the six-step ETV CCEP process. Figure 1 shows the steps in the overall process. The details of each step follow. It is important to read and understand the details of each step in the verification process.



An ETV CCEP Focus Area could be a type of coating, a type of equipment, an application, or some other category of organic finishing technology. Focus Areas will be identified based on industry needs. They will then be evaluated by the Stakeholder Group, which will provide insight about each potential technology; however, the final focus area decision rests with the ETV CCEP

The ETV CCEP will issue a Request for Technologies (RFT) and a Commerce Business Daily (CBD) announcement for each focus area. Respondents must be willing to provide time and funding, in addition to the technology to be tested.

The ETV CCEP will review the proposals for relevance of the information and eligibility of the technology for verification. The ETV CCEP will make selections based on advice provided by the Stakeholder Group, in addition to its own judgment.

Test protocols detailing effectiveness of the technology in satisfying not only the organic finishing requirements, but also the environmental requirements will be finalized based on the current Focus Area. These protocols will be reviewed and agreed to by technology providers, and will become the definitive requirement for verification.

Verification testing will be performed at *CTC*, on the organic finishing line. If testing must take place elsewhere, it will be done under the control and observation of ETV CCEP personnel, and in compliance with the protocol.

A verification report will be prepared for the EPA detailing the results of the verification process as measured against the test protocol. The technology provider will have the opportunity to review the report, following EPA approval. Release of the verification statement will be at the technology provider's option. Once released, the verification statement will be made available through the Internet and other information channels.

Figure 1. The ETV CCEP Verification Process

Step 1 - Focus Area Chosen

Because of the wide variety of surface coatings, coating technologies, and coating applications available in the marketplace, a focus area will be chosen for each verification testing series to be done. The focus area could be a type of coating (powder, for example), a type of application equipment (high-volume, low-pressure (HVLP) spray guns, for example), an application (such as high temperature coatings for automotive engine parts), or some other category of organic finishing technology. Once the focus area has been defined, a request for technologies in that area will be issued to solicit products for testing. Upon completion of the verification process, a new focus area will be chosen, and so on. Potential focus areas will be investigated and justified according to product need, usage volume, emissions reduction potential, etc. Potential focus areas will be presented to the stakeholder group for evaluation, recommendation, and possibly, additional suggestions. The focus area will also be identified based on information about industry needs and trends obtained from industry associations, organizations, publications, and users groups. The final decision rests with the ETV CCEP.

Step 2 - Request for Technologies (RFT) Issued

Upon selection of the focus area, as mentioned above, the ETV CCEP will issue a request for technologies (RFT) for that area. The program will accept responses from individuals and companies who are interested in obtaining an unbiased evaluation/verification of the innovative technology (product or equipment) which they want to market to the manufacturing community. Keep in mind that it need not be "high tech" to be an innovative technology.

Technology providers will be asked to provide information in accordance with the RFT, including: a fact-sheet and/or specification sheet, Material Safety Data Sheet (MSDS), performance results, and a description of the uses/applications of the technology. A product/technology sample for accepted technologies will be required prior to the time of testing, once the Services Agreement has been signed. The information needed from potential technology providers is outlined more clearly in "Information Requested," found in Section 2 of this document. In addition, as the ultimate goal of this program is to become self-supporting, the technology provider will also be asked to contribute funds for completion of the initial testing and verifications. An estimate of the cost of a typical test will be given as a guideline. To help establish the program, a limited number of verification tests will be performed where the ETV CCEP and the technology provider share the cost. However, limited funds are available to support verification testing. The minimum technology provider contribution for initial verification testing will be determined by the amount of funds available to support testing, the cost to perform the testing per product, and the number of technology

providers participating. After a certain point, the technology providers will pay all costs for the verification process.

It is also important to note that the ETV CCEP is organized to handle only market-ready technologies that are sufficiently developed such that they are ready to be marketed and sold. In other words, the innovative technology has to be more than just a concept.

The ETV CCEP is designed to provide a service to both the owner of an innovative technology as well as the potential purchasers and users of the technology. To protect the interest of all parties involved, and in keeping with its overall objective, the program requires that technologies submitted for consideration for verification testing satisfy the following "selection criteria":

1. The technology must meet the specific product definition and qualifications for a particular focus area, as defined in the RFT.
2. The technology is an organic surface coating product or application technology.
3. The technology has pollution prevention or emissions reduction as a central focus and has existing applications in industry.
4. The technology provider owns the product and its associated technologies, or controls the right to use it under a licensing or other legal agreement.
5. The technology is "market-ready" meaning that it is beyond the conceptual stage and is in fact ready for introduction into use within the manufacturing engineering community.
6. The issues in question regarding product performance must be such that a definitive test can be devised to obtain clear, unambiguous results.

THE ETV CCEP WILL NOT ACCEPT A TECHNOLOGY UNTIL A SOLICITATION (i.e., RFT AND COMMERCE BUSINESS DAILY (CBD) ANNOUNCEMENT) FOR A FOCUS AREA TO INCLUDE THAT TECHNOLOGY IS ISSUED.

Step 3 - Review of Responses to the RFT

Upon receipt of the information package submitted to the ETV CCEP by responders of the RFT, program personnel will review the information. Please note that program personnel will rely primarily on the facts supplied in the information package. Therefore, it is important that the package be as clear and comprehensive as possible. The purpose of the review is to determine if the information is relevant and if the technology is eligible for verification testing.

If the review indicates that a product does not match the selection criteria, or is not in keeping with the general operational objectives of the program, the candidate will be contacted and provided with an opportunity to discuss the determination. Subsequently, the information will be returned with, as appropriate, a written explanation describing why the product has not been selected for verification testing.

Once the review of the information is complete, the candidate will be contacted by program personnel to discuss the next steps. The ETV CCEP reserves the right to accept or reject potential technologies based solely on whether the product information satisfies the ETV CCEP selection criteria, operational objectives, and stakeholder input. Stakeholders will help set guidelines and provide input; however, the ETV CCEP will make final selections.

Step 4 - Protocol Finalized

CTC will develop test protocols for the ETV CCEP. These protocols will be tailored to the specific focus area verification to be accomplished. The ETV CCEP will use existing test methods and specifications (EPA, ASTM, ANSI, etc.) for verification testing. The final protocol will be a product-specific protocol that identifies the scope of the verification testing, test procedures and test methods to be used, and the proposed schedule. The candidate will have a chance to review, and must agree to, a product-specific test protocol prior to verification testing. A meeting for potential technology providers will be held to give candidates an opportunity to find out more details of verification testing, comment on the test protocol, and ask any questions about the program. This will give the candidate a final opportunity to decide whether sufficient interest and funds exist to proceed with the verification process. Upon approval by the technology provider, program personnel will initiate the Services Agreement with the candidate to obtain commitment to proceed. This agreement is a contractual agreement between the ETV CCEP and the technology provider. The EPA has no direct contractual obligations regarding the verification process. Once the agreement has been signed, the proper fees have been paid, test materials have been received from the technology provider, and the protocol has been finalized, verification testing will proceed. Note that technology providers are responsible for lending the materials/equipment, free of charge, to the ETV CCEP for verification testing.

Step 5 - Verification Testing Performed

Verification testing will take place at *CTC* using in-house personnel and resources; however, it may be necessary to test a particular technology away from the Demonstration Factory at *CTC*. If such is the case, this testing will be done under the control and close observation of ETV CCEP personnel, and always in

compliance with the test protocol. This includes any and all quality assurance and appropriate laboratory analyses.

Step 6 - Verification Report Prepared/Statement Issued

Upon completion of verification testing in accordance with the test protocol, a report will be prepared for the EPA that details the results of the verification testing. The report will comprehensively and accurately document the results of the verification testing of the product against the specific criteria detailed in the test protocol. Technology providers will have the opportunity to review the verification data after EPA approval. The report will be submitted to the EPA for publication as an EPA report and a verification statement will be issued by the EPA based on the data in the report. Note that release of the verification statement is the technology provider's option. To maximize the program's exposure to the coatings industry, the verification statement will be made available over the Internet on the ETV web-site (*http://www.epa.gov/etv*) as well as through other sources, for example, publications and meetings. This will also establish the ETV CCEP's reputation in the private sector. A long-range goal of this initiative is to grow the program's reputation so that it becomes a vital resource to industry, and, thus, becomes self-sustaining through private support. This is in addition to its primary objective of improving the environment by introducing more environmentally friendly coating technologies into the industry more rapidly. Should the technology provider not agree with the verification results, the test report will still be submitted to the EPA; however, no verification statement will be issued. The EPA and the ETV CCEP will keep a copy of all reports on file. Technology providers are allowed one chance, with EPA support, at verification per product per focus area. Retests will be available, provided that the technology provider pays 100% of the cost.

Benefits of Participation

Participation in the ETV CCEP process has many associated benefits. In addition to obtaining unbiased, third party verification of the technology provider's product, the program will prepare and distribute a statement, under EPA signature, which verifies that the technology met the performance goals established by the test protocol. Technology providers will be working with *CTC* and EPA regional and laboratory staff in all aspects of the verification. Technology providers may gain valuable insights into the needs of their customers. The ETV CCEP has an aggressive information distribution program (the Information Diffusion Strategy) whereby the results of verification testing will be distributed to all applicable user groups and regulators to increase their awareness of the technology. This benefit assures the maximum exposure and visibility of the results of verification testing. Therefore, participation can maximize the technology provider's marketing

resources. Furthermore, verification conducted under the auspices of the ETV CCEP may alleviate the need to do product-specific verifications at the direction of each potential user or customer. The ETV CCEP stakeholder group includes representation from Federal and State regulatory agencies that will provide input on the development of the verification testing. This will enhance the acceptance of the verified technology. Finally, becoming involved early in the ETV CCEP offers the added benefit of cost sharing. A limited number of verifications will be performed where the program and the technology provider share the cost. However, the ultimate goal of the program is to become self-supporting; therefore, after a certain point (determined by initial response to the ETV CCEP and resources available) all costs for the verification process will be paid by the technology providers.

For More Information

The program's ultimate goal is to foster the introduction of innovative environmental surface coating technologies throughout the marketplace. This document has been designed to provide an overview of the ETV CCEP verification process. If you have any questions, comments, or would like more information, please do not hesitate to contact program representatives at *CTC* or at the EPA.

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2.0 INFORMATION REQUESTED

In order to consider a technology for verification testing, it is necessary to know as much about the technology as possible to ensure that it meets all the requirements outlined in the selection criteria (see pg. 9). This section outlines the information needed to help facilitate the ETV CCEP verification process. Please provide all of the pertinent requested information. Also, the program asks that you please attach any of the following that apply to the technology provider's product: a fact-sheet and/or specification sheet, Material Safety Data Sheet (MSDS), performance results, and a description of the uses/applications of the technology. Furthermore, feel free to reference and/or attach any product brochures, journal articles, test reports, or other supplementary materials that may assist in understanding the unique features and functions of the product.

An optional form for the requested information is located on the following pages.

DRAFT

PRODUCT INFORMATION REQUIRED

A. Technology Contact

Please provide the person most familiar with the product.

Company Name _____

Name of Contact _____

Address _____

Phone/Fax _____

E-mail _____

Internet Web Site, if available _____

The following information will also be needed regarding the company contact:

Are you the owner of the technology by patent, license, or other legal agreement?

_____

_____

B. Technology/Product Information

Please provide the following information about the product in the form of brochures, MSDS forms (required for testing), specification sheets, etc.

Product or Trade Name _____

_____

Description or Composition _____

_____

Intended Use/Application _____

_____

What specific technological problem or need is the product intended to address?

What are the specific pollution prevention features of the product that make it better than traditional products used for the same application?

What innovative feature of the technology is intended to satisfy the intended problem/need?

What types of testing, if any, have been done to ensure that the product is fulfilling the intended function?

Please state a brief history of the technology development, introduction, and acceptance to date. Where applicable, include a description of any predecessor product.

Summarize any tests/verifications already performed on the product, including the place, date, and result of testing.

C. Patents

Does the product involve proprietary technology?

Is the product patented, copyrighted, or otherwise protected?

Is there any specific information regarding your company, the product, and your involvement with the ETV CCEP, or any other matter that you wish to be treated as strictly confidential? If so, please describe.

3.0 VERIFICATION PROCEDURES

This section outlines the procedures that will be used in developing, conducting, and reporting ETV CCEP verifications.

3.1 The Stakeholder Group

As mentioned previously, a stakeholder group comprised of experts in the field of organic finishing has been formed for the ETV CCEP. Members of the group serve as unpaid volunteers and were selected by program personnel. The members were chosen on the basis of their recognized personal and professional expertise and experience and not as representatives of the organizations for whom they work or with which they may be associated.

The duties and responsibilities of the Stakeholder Group include:

1. Provide guidance on selecting technology focus areas for the program.
2. Help select technologies for verification testing.
3. Add input to the development of documents for the program.
4. Lend expertise on future opportunities for testing.
5. Attend two stakeholder meetings per year.
6. Participate in periodic conference calls for group discussions.
7. Assist with technical outreach/information diffusion.

3.2 Test Protocols

Test protocols will be developed for each focus area selected for verification. For each technology submitted for verification, protocols will be tailored for specific applications and specific performance parameters to be evaluated. The protocols will be reviewed by the ETV CCEP, the EPA, the Stakeholder group, and the technology provider. The technology provider must agree to the test protocol prior to verification testing. To date, the ETV CCEP has developed draft test protocols for several organic finishing applications, including HVLP spray equipment, powder coatings (in general), and ultra-violet (UV) curable coatings. Draft versions of these protocols can be found on the ETV web site (*http://www.epa.gov/etv*).

3.3 Verification Criteria

The verification criteria used to assess a particular product or technology will provide a sufficiently complete and comprehensive picture of the functional performance. Other factors including economic impact and elements of life cycle costs (such as maintenance requirements) of the product may be evaluated, depending on the focus area and pertinence to the intended application, in order to provide a reasonable basis for future purchasing decisions by potential users.

In general, developing the overall verification criteria, for either coatings or coating application equipment, will require assessment of the following categories of variables. Verification tests may include, but are not limited to, the following:

For Coating Products

- Environmental Performance
  - Does the product perform as stated or intended?
    - VOC reduction, better transfer efficiency, less overspray, etc.
- Coating Quality
  - Impact Resistance
  - Mandrel Bend
  - Solvent Resistance
  - Salt Spray
  - Weather Resistance
  - Humidity Resistance
  - Hardness of Cured Film
  - Adhesion
  - Color
  - Gloss
  - Distinctness of Image (DOI)
- Film Thickness
- Application Viscosity
- Application Temperature
- Application Pressures
- Percent Solids
- Practicality
  - Is the product easy to use?
    - Required special labor, equipment, or other modification to standard processes needed for application,
    - Sensitivity to any operating conditions (humidity, temperature, wind, etc.),
    - Achievable production/operation rates,
    - Availability of training and customer support, if necessary,
    - Any other special requirements or limitations.

In addition, the following characteristics may be monitored and commented upon if necessary:

- Safety Aspects
  - Is the product safe to use?
    - Effects on surroundings
    - Worker safety
    - Potential hazards
- Other Environmental Characteristics (other than VOC emissions)
  - Is the product environmentally sound?
    - Effects on air, water, soil (waste disposal)
    - Recyclability, if applicable

For Coating Application Equipment

- Environmental Performance
  - Does the product perform as stated or intended?
    - VOC reduction, better transfer efficiency, less overspray, etc.
- Transfer Efficiency
- Film Thickness Uniformity
- Faraday Cage Effects
- Wrap-Around
- General Coating Quality Tests, as needed
- Maximum Working Pressures/Temperatures
- Practicality
  - Is the technology easy to use?
    - Required special labor, equipment, or other modification to standard processes needed for application,
    - Sensitivity to any operating conditions
    - (weather, electrostatic considerations, etc.),
    - Achievable production/operation rates,
    - Availability of training and customer support,
    - Any other special requirements or limitations.

In addition, the following characteristics may be monitored and commented upon if necessary:

- Safety Aspects
  - Is the product safe to use?
    - Effects on surroundings
    - Worker safety
    - Potential hazards
- Other Environmental Characteristics (other than VOC emissions)
  - Is the product environmentally sound?

- Effects on air, water, soil (waste disposal)
- Recyclability, if applicable

- Maintenance Requirements
  - Does the product require frequent or significant upkeep?
    - Repair history
    - Ease of repair
    - Cost of repair

Note that the above is meant to be a list of example verification parameters and may not be identical to the final verification factors included in the test protocols.

Product-specific test plans will be developed for each technology submitted for verification testing. Specific tests to be completed as part of the verification are addressed in the product-specific test protocol. These tests are decided upon based on the characteristics of the technology itself and input from the ETV CCEP, the technology provider, and the stakeholder group. The technology provider will review and approve the test protocol prior to verification testing. The product-specific test plan (and its approval by the technology provider) is incorporated into the Services Agreement (by reference).

3.4 Report of Results for Verification Testing

The goal of the technology evaluation is to be clear, correct, concise, and convincing. All of the ETV CCEP technology verifications submitted to the EPA will include, but will not be limited to, the following general features:

1. Title Page. The title page will include the program title, verification number, date, and a disclaimer. The disclaimer shall state: "This report is the result of an impartial approach to evaluating innovative environmental technology in accordance with the ETV CCEP test protocol. The data presented are believed accurate and the analyses credible. The statements made and conclusions drawn regarding the product evaluated do not, however, amount to an endorsement or approval of the product in general or for any particular application."

2. Verification Statement. The verification statement will be included as part of the verification report. The verification statement will include information on the technology verified and the verification tests performed. It will be identical to the document given to the technology provider by the EPA upon successful completion of the verification process.

3. Table of Contents. The table of contents will include a List of Tables and a List of Figures, as needed.

4. Executive Summary. An executive summary will be written, which will include the following: technology description, objectives of the verification testing, the type of testing employed, a summary of the results, and principal conclusions.

5. Body of the Report. The body of the report will include any introductory/background material needed to give readers an understanding of the ETV CCEP and the verification testing performed. The body will also include a list of verification objectives and it will describe the verification testing itself. Verification criteria will be discussed as well as the results of the verification testing. Finally, there will be a section to conclude the report, restating the results and key findings.

6. References, Appendices, and Disclaimer. The report shall include a list of references and appendices, as needed. An additional disclaimer will be included. It will be as follows: "This report is based upon work supported by the United States Environmental Protection Agency. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the United States Environmental Protection Agency."

4.0 ETV CCEP OPERATING POLICIES

This section describes the operating policies of the ETV CCEP and is intended to ensure that the manner in which the program will conduct itself is understood.

Contractual issues, including confidential information, liability, termination of the verification process, fee payment, and other such topics, are discussed in the Services Agreement that will be executed between *CTC* and the technology provider prior to verification testing.

4.1 Fundamental Tenets

1. The ETV CCEP will accept technologies from any individual or organization that owns or controls the technology or product to be verified; however, technologies will only be accepted when a request for the focus area within which the technology or product applies is open.

2. The ETV CCEP does not endorse, approve, or authorize for use any product that it evaluates. Rather, it provides the service of applying a national, consensus-based verification process, incorporating a cross-section of participants, which provides end users with a sound and rational basis for future purchasing decisions.

3. An ETV CCEP verification will not of itself guarantee that the user community will authorize or permit the use of the specific product. Likewise, the ETV CCEP verification process will not relieve the candidate from all the burdens typically associated with the introduction of a new product. However, the ETV CCEP approach, utilizing a panel of knowledgeable and experienced professionals (the stakeholder group) and conducting scientifically based verifications, can minimize that burden. In appropriate cases (i.e., where the verification shows that the product performs as stated or intended), an ETV CCEP verification can assist in the successful entry and acceptance of the product in the marketplace.

4. The ETV CCEP reserves the right, at any stage, to suspend or terminate the ETV CCEP verification process with or without cause.

5. Since candidates voluntarily choose to contract with the ETV CCEP to obtain verification of their product and are responsible to pay for costs incurred for those services, the candidate is free to terminate the ETV CCEP verification process, in accordance with the Services Agreement, provided that all contractual payment obligations to the ETV CCEP are satisfied, or with cause, provided that the candidate shall remain obligated

to pay that portion of the fee corresponding to all costs incurred by the ETV CCEP up to the effective date of termination.

6. Release of verification statements is the technology provider's option. The verification report will be submitted to the EPA. Upon EPA approval of the results, technology providers will have the opportunity to review the verification test data. The EPA will issue verification statements. The EPA will publish each verification report and the EPA and *CTC* will keep them on file.

4.2 Publication and Release of Verification Reports and Statements

While a variety of periodic reports and other writings may be required to provide for proper planning, management, and control of the verification process, the only reports which will be published by the EPA are the verification reports. Verification statements are optional for the vendor; however, if a verification statement is prepared, it will be released to target audiences.

ETV CCEP staff will prepare verification reports for the EPA. If a verification statement is prepared, the EPA Project Manager will provide a draft verification statement to the candidate. It will then be finalized and released to target audiences, the environmental community, and the public at large via the ETV web site. As mentioned above, the candidate may direct the ETV CCEP and the EPA not to complete and publish the verification statement. However, if the candidate subsequently markets the product and alludes to the ETV CCEP verification testing in its promotional efforts or other dealings with potential customers, or otherwise discloses the existence of the verification statement, the ETV CCEP reserves the right to finalize, publish, and release the verification statement.

The ETV CCEP, via the EPA, will retain the ultimate authority, in conjunction with the technology provider but subject to the exception described above, to determine whether or not to publish or release copies of the final report.

Furthermore, the ETV CCEP reserves the absolute right to release any data or information in the final report and any portions of the referenced report which deal with safety or environmental issues which the ETV CCEP believes requires public release; for example, if it appears that the product is being used in such a manner as to pose a threat to public safety or pose a hazard to the environment. In the event that the ETV CCEP feels a responsibility exists to distribute a report or portion thereof, a reasonable effort will be made to contact the candidate prior to release.

5.0 DEFINITIONS

Candidate: An individual or organization that submits a product for ETV CCEP verification testing.

Consultant: A collective term applied to consulting engineers, university research centers, private and public testing facilities and other outside sources of expertise used to support the planning and conduct of ETV CCEP verification testing.

Existing Standard: A nationally recognized or widely accepted standard, code, or specification that can be used to evaluate the functional performance of a product.

Governing Principles: A statement of the standards of ethical and professional behavior expected of all participants in the ETV CCEP process.

Innovative Features: Characteristics or qualities which distinguish a product, the performance effects of which cannot easily be evaluated against an existing standard.

Market-Ready: A product that is far enough along in the development cycle such that it is ready for general production, marketing, and sale.

Participants: Persons involved directly or indirectly in the management and operation of the ETV CCEP or engaged in carrying out the ETV CCEP verification process.

Product: Any one of a wide variety of innovative surface coating technologies, including materials, equipment, applications, or processes, which can be used in the organic finishing industry.

Selection Criteria: The specific criteria that define the products that ETV CCEP will accept for evaluation.

Services Agreement: A contractual document executed between the ETV CCEP and the technology provider that both parties must agree to prior to verification testing.

Stakeholder Group: A group of unpaid volunteers, chosen on the basis of their recognized personal and professional expertise and experience who assist the ETV CCEP at various stages of the verification process.

Technology Provider: see Candidate.

Test Protocols: Product-specific plans developed by the ETV CCEP which describe the technical and administrative details to be followed in conducting ETV CCEP verification testing. The test protocol will identify the specific objectives and scope of the work, among other things.

User (or End User): The individual or organization, whether in the public or private sector, ultimately responsible for specifying, purchasing, or otherwise putting an ETV CCEP product into practice.

Verification Criteria: The specific measures used in ETV CCEP verification testing to gauge the overall performance of a particular product.

Verification Report: The report provided to the EPA by *CTC* which documents the results of a verification of a product against the specific criteria detailed in the ETV CCEP test protocol. Verification reports will be published by the EPA.

Verification Statement: The statement, issued by the EPA, based on the data in the verification report. The statement will confirm the testing of the product against the specific criteria detailed in the ETV CCEP test protocol. Verification statements are optional for the vendors.